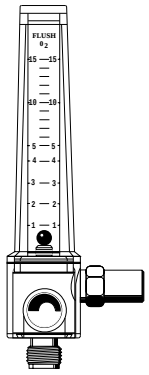
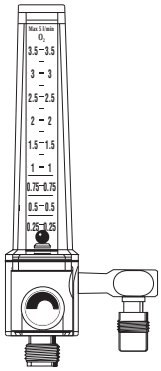
Ohio Medical Corporation™

Oxygen and Air Pressure Compensated Flowmeters

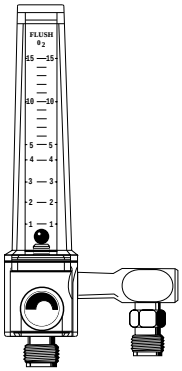
Service Manual



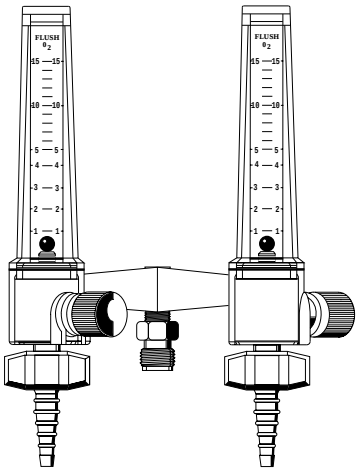
PC Flowmeter



Lo-Flo 3.5™ Flowmeter



PC Flowmeter with Power



Twin Flowmeter with Power Outlet

User Responsibility

This Product will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts, when assembled, operated, maintained and repaired in accordance with the instructions provided. This Product must be checked periodically. A defective Product should not be used. Parts that are broken, missing, plainly worn, destroyed or contaminated, should be replaced immediately. Should such repair or replacement become necessary, Ohio Medical recommends that a telephonic or written request for service advice be made to the nearest Ohio Medical Service Office. This Product or any of its parts should not be repaired other than in accordance with written instructions provided by Ohio Medical, or altered without the prior written approval of Ohio Medical's Safety Department. The user of this Product shall have the sole responsibility for any malfunction which results from improper use, faulty maintenance, improper repair, damage, or alterations by anyone other than Ohio Medical Corporation.

Important: U.S. Federal law restricts this device to sale by or on the order of a licensed medical practitioner.

Important: This document is not to be reproduced in any manner, nor are the contents herein to be disclosed to anyone without the express authorization of Ohio Medical Corporation, Gurnee, IL, USA.

Technical Competence

The procedures described in this service manual should be performed by trained and authorized personnel only. Maintenance should only be undertaken by competent individuals who have a general knowledge of and experience with devices of this nature. No repairs should ever be undertaken or attempted by anyone not having such qualifications. Genuine replacement parts manufactured or sold by Ohio Medical must be used for all repairs.

Read completely through each step in every procedure before starting the procedure; any exceptions may result in a failure to properly and safely complete the attempted procedure.

Abbreviations Used In This Manual

°C	Degrees Celsius
CW	Clockwise
CCW	Counterclockwise (Anti-clockwise)
CGA	Compressed Gas Association
DISS	Diameter Index Safety System (Per CGA V-5)
°F	Degrees Fahrenheit
FSD	Full Scale Deflection
ft-lb	Foot-Pound
in (")	Inch (example: 1" = 1 inch)
in-lb	Inch-Pound
kPa	Kilo Pascal
l/min	Liters Per Minute
mm	Millimeter
N-m	Newton-Meter
NPTF	National Pipe Thread, Female (USA)
O_2	Oxygen
oz	Ounce
OPG	Oxygen Proof Grease
PC	Pressure Compensated
psi	Pounds Per Square Inch
psig	Pounds Per Square Inch Gauge
PTFE	[1]Teflon®
NA	North American
INTL	International
CAN	Canadian
GR	German

[1] Teflon is a registered trademark of the E.I. DuPont Company.

Table of Contents

1/Precautions 1-1
1.1 Definitions 1-1
1.2 Warnings 1-1
1.3 Cautions 1-2

2/Scope 2-1
2.1 PC Flowmeter 2-1
2.1.1 Oxygen Flowmeter 2-1
2.1.2 Air Flowmeter 2-1
2.2 PC Flowmeter with Power Outlet 2-2
2.3 Twin Flowmeter 2-3
2.3.1 Oxygen Flowmeter 2-3
2.3.2 Air Flowmeter 2-3
2.4 Twin Flowmeter with Power Outlet 2-3

3/Description and Specifications 3-1
3.1 Description 3-1
3.1.1 Oxygen and Air Pressure Compensated Flowmeters 3-1
3.1.2 Oxygen Lo-Flo 3.5 Flowmeter 3-1
3.1.3 Twin Flowmeter 3-1
3.2 Specifications 3-2

4/Operation 4-1
4.1 Equipment Set-Up 4-1
4.2 Setting the Flow Rate 4-1
4.3 Pre-Use Checkout Procedure 4-2
4.4 Patient Setup 4-3

5/Cleaning and Sterilization 5-1
5.1 Cleaning 5-1
5.1.1 Routine Exterior Cleaning 5-1
5.1.2 Internal Component Cleaning 5-1
5.2 Sterilization 5-1

6/Troubleshooting 6-1

7/Service-Disassembly and Assembly 7-1
7.1 Service Tools and Equipment 7-1
7.2 Disassembly 7-3
7.2.1 Flow Control Valve - Disassembly 7-3
7.2.2 Flow Control Valve - Reassembly 7-3
7.2.3 Flowmeter - Disassembly 7-3
7.2.4 Flowmeter - Reassembly 7-4
7.2.5 Power Outlet - Disassembly 7-4
7.2.6 Power Outlet - Reassembly 7-4

8/Service Checkout Procedure 8-1
8.1 Set-up 8-1
8.1.1 Equipment 8-1
8.1.2 Gas supply check. 8-1
8.2 Flow Control Test 8-2
8.3 Flow Control Valve Leak Test 8-2
8.4 Overall Leak Test 8-2
8.5 Flow Calibration Test 8-2
8.5.1 Flow Calibration Test Table (0 - 15 l/min) 8-2
8.5.2 Flow Calibration Test Table (0 - 3.5 l/min) 8-2
8.6 Max Flow Test 8-2
8.6.1 Max Flow Limits Table 8-2

9/Maintenance 9-1
9.1 General Maintenance of Oxygen Therapy Equipment 9-1
9.2 Recommended Maintenance Schedule 9-1
9.3 Repair Policy 9-1
9.4 Technical Assistance 9-1
9.5 Return Instructions 9-1
9.5 Lifetime Warranty Policy 9-2

10/Ordering Information 10-1
10.1 Illustrated Parts 10-1
10.1.1 Illustrated Parts for 0 - 15 l/min Flowmeters 10-1
10.1.2 Illustrated Parts for Lo-Flo 3.5 l/min Flowmeters 10-2
10.2 Service Kits 10-3
10.2.1 Flow Control Valve Assembly 10-3
10.2.2 Flow Control Valve Assemblies (4) 10-3
10.2.3 Flow Control Knobs (4) 10-3
10.2.4 O-Ring Replacement Set 10-3
10.2.5 DISS Power Outlet with 1/8” NPT Male Thread 10-3
10.3 Fittings and Adapters 10-4
10.4 North American (50 psi) Flowmeter Options 10-5
10.5 International (414 kPa) Flowmeter Options 10-6
10.6 Canadian (50 psi) Flowmeter Options 10-7
10.7 German (5 bar) Flowmeter Options 10-8

Appendix A-1
A.1 Installation procedure for Adapters/Probes and Fittings A-1
A.2 How To Use Teflon Tape A-1

Notes

1/Precautions

1.1 Definitions

Note: A Note provides additional information to clarify a point in the text.

Important: An Important statement is similar to a note but of greater emphasis.

⚠CAUTION: A CAUTION statement is used when the possibility of damage to the equipment exists.

⚠WARNING: A WARNING statement is used when the possibility of injury to the patient or the operator exists.

European Union Representa-

1.2 Warnings

On models with a power outlet, the supply pressure at the flowmeter will decrease during periods of high flow from the power outlet. This will cause a decrease in flowmeter accuracy. The actual flow from the flowmeter outlet will be lower than that indicated. For example, with 150 l/min flowing from the power outlet, the supply pressure drops from 50 psi to 46 psi and the actual flow from the flowmeter is then lower than indicated by up to 20%.

Do not use a flowmeter with any cracked or damaged plastic components, gas leaks, loose fittings or knobs, or any missing components. Supply gas pressure can cause parts to be expelled and injury may occur.

Do not connect flowmeter to supply pressures in excess of 72.5 psi (5 bar). Excess supply pressure can cause parts to be expelled and injury may occur.

The flowmeter is only intended for the gas specified on flowmeter label. Do not use the flowmeter with any other gases. Inaccurate flow indications and patient injury may result.

The flowmeter is calibrated using the gas supply pressure and temperature shown on the flowmeter label. Varying pressure, temperature or both will reduce accuracy.

Power outlet models ONLY - Connect the high pressure hose to the therapy device before making the connection to the flowmeter power outlet.

After patient use, oxygen therapy equipment may be contaminated. Handle in accordance with your hospital's infection control policy.

Routine cleaning with certain disinfectants or liquid sterilizing agents may cause deterioration and cracking of the plastic components, ultimately leading to equipment failure and possible patient or operator injury. Therefore periodic visual inspection of these parts is extremely important.

Never use any petroleum-based lubricants in an oxygen environment, as these materials are highly combustible in the presence of oxygen. The only oxygen service lubricants recommended for this equipment are [2]Sentinel® OPG or [3]Ball Vac-Kote® 37951M.

If the flowmeter is repaired or disassembled in any manner, the Service Checkout Procedure must be performed before returning the equipment to service.

The Pre-Use Checkout Procedure must be performed before using this equipment on each patient. If the flowmeter fails any part of the Pre-Use Checkout Procedure, it must be removed from service and repaired by qualified service personnel.

Do not allow oxygen or oxygen equipment to be exposed to fire, sparks, or electrical equipment which may provide a source of ignition. DO NOT SMOKE IN THE AREA WHERE OXYGEN IS IN USE.

Clean and sterilize all respiratory equipment before shipment or service to ensure transportation personnel and/or service personnel are not exposed to any hazardous contamination.

Prior to any servicing, disconnect the flowmeter from the gas supply.

Never mix adapters of different gases or vacuum. Cross connection can result in serious patient injury or damage to equipment.

Use the Lo-Flo 3.5 flowtube and ball supplied together as a set when replacing the existing tube or ball in the Lo-Flo 3.5 Flowmeter, and use only with a Lo-Flo 3.5 manifold (containing flow limiting orifice).

The Lo-Flo 3.5 flowmeter is not to be used on patients requiring more than 3.5 l/min oxygen. The Lo-Flo 3.5 flowmeter is not for resuscitation. 5 l/min Max.

[2] Sentinel is a registered trademark of the Sentinel Lubricants Corp.

[3] Ball Vac-Kote is a registered trademark of the Ball Aerospace Division.

1.3 Cautions

Do not use excessive force when closing the flow control knob. This may cause a decrease in valve life.

Use of lubricants, solvents or cleansers other than recommended, may degrade plastic or rubber components.

Do not use any [5]Loctite® (or any product which contains methacrylate ester) on any part of the flowmeter or connected fittings. Loctite® may damage plastic components.

Do not over-tighten straight thread power outlet body; body may crack and cause leaks. O-ring seals body to the extension.

Flowmeters should be kept in use or used on a rotating basis. Unused equipment may tend to deteriorate.

Only competent individuals trained in the repair of this equipment should attempt to service it.

An Ohmeda power outlet extension, twin “Y” adapter or extension adapter must be directly connected to the flowmeter manifold prior to connection to the supply gas.

[4]Freon is a registered trademark of the E.I. DuPont Company.

[5]Loctite is a registered trademark of the Loctite Corporation.

2/Scope

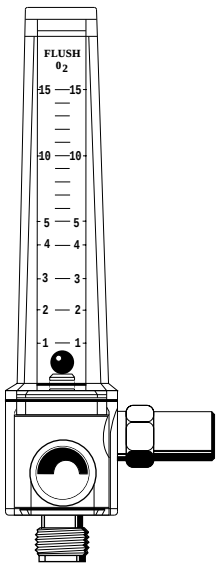
This service manual contains service, maintenance,
and parts information on the following models of Pressure Compensated (PC) Flowmeters:

Oxygen (0 - 15 & 0 - 3.5 l/min)	**Air (0 - 15 l/min)**
PC Flowmeter	PC Flowmeter
PC Flowmeter w/Power Outlet	PC Flowmeter w/Power Outlet
Twin PC Flowmeter	Twin PC Flowmeter
Twin PC Flowmeter w/Power Outlet	

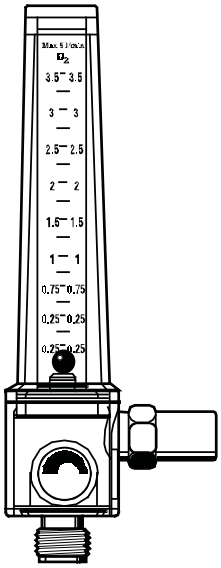
The following language versions are available:

North American (NA), 50 psi
International (INTL), 414 kPa (60 psi)
Canadian (CAN), 50 psi
German (GR), 5 bar (72.5 psi)

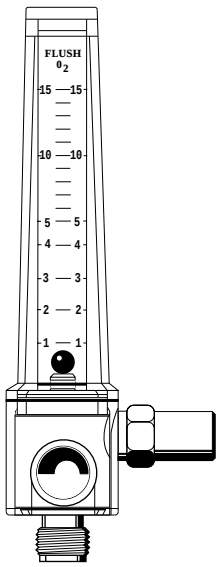
2.1 PC Flowmeter*



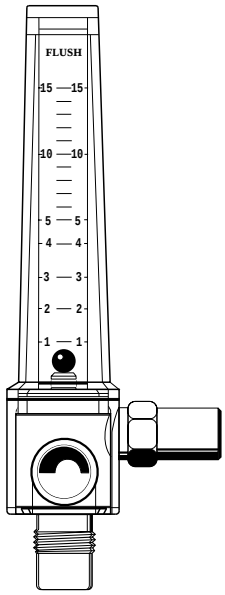
Oxygen PC Flowmeter w/O_2 DISS outlet fitting



Oxygen Lo-Flo 3.5 Flowmeter w/O_2 DISS outlet fitting



Air PC Flowmeter w/O_2 DISS outlet fitting



Air PC Flowmeter w/Air DISS outlet fitting

2.1.1 Oxygen Flowmeter

Part numbers below are for **Oxygen** Flowmeters with 1/8” NPTF adapter and standard O_2 DISS fitting.

	0 - 15 l/min	**0 - 3.5 l/min**
NA (50 psi)	6700-1260-907	6700-1305-907
INTL (414 kPa)	6700-1280-907	6700-1309-907
CAN (50 psi)	6700-1284-907	
GR (5 bar)	6700-1400-907	6700-1404-907

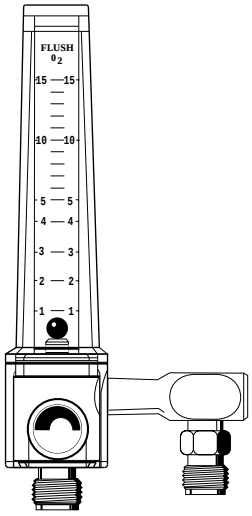
2.1.2 Air Flowmeter

Part numbers below are for **Air** Flowmeters with 1/8” NPTF adapter and standard O_2 DISS fitting, or Air DISS fitting.

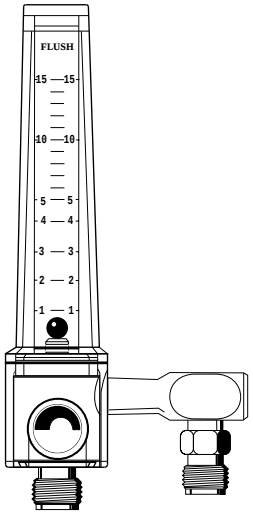
	O_2 DISS 0 - 15 l/min	**Air DISS 0 - 15 l/min**
NA (50 psi)	6700-1264-907	6700-1267-907
INTL (414 kPa)	6700-1286-907	
CAN (50 psi)	6700-1290-907	6700-1291-907
GR (5 bar)	6700-1402-907	

* For other Oxygen and Air configurations, see the “Flowmeter Options”

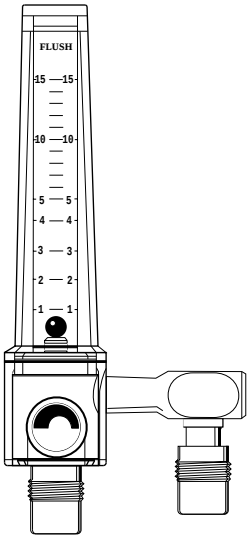
2.2 PC Flowmeter with Power Outlet*



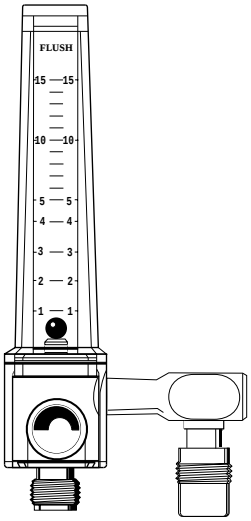
Oxygen PC Flowmeter w/O_2 DISS outlet fitting & O_2 DISS power outlet NA (50 psi). . . 6700-1261-907



Air PC Flowmeter w/O_2 DISS outlet fitting & O_2 DISS power outlet NA (50 psi) . . . 6700-1265-907



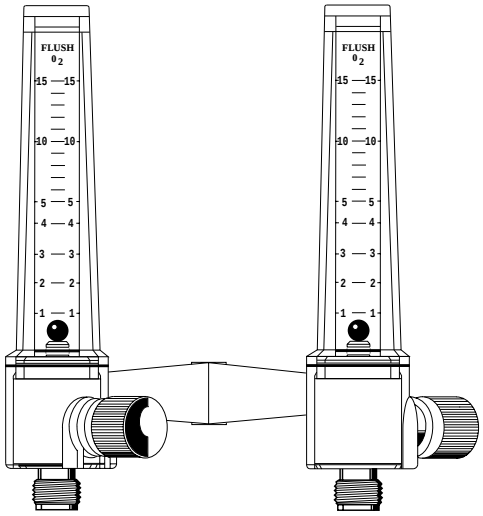
Air PC Flowmeter w/Air DISS outlet fitting & Air DISS power outlet NA (50 psi) . . . 6700-1268-907



Air PC Flowmeter w/O_2 DISS outlet fitting & Air DISS power outlet NA (50 psi) . . . 6700-1266-907

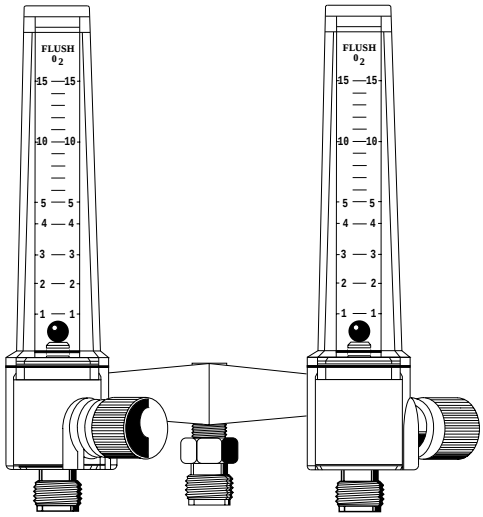
* For other Oxygen and Air configurations, see the “Flowmeter Options” section.

2.3 Twin Flowmeter*



Twin Flowmeter

2.4 Twin Flowmeter with Power Outlet*



Twin Flowmeter with Power Outlet

2.3.1 Oxygen Flowmeter

Part numbers below are for Oxygen Twin Flowmeters with 1/8” NPTF “Y” adapter and standard O_2 DISS fitting.

	0 - 15 l/min	0 - 3.5 l/min
NA (50 psi)	6700-1262-907	6700-1307-907
INTL (414 kPa)	6700-1292-907	6700-1313-907
CAN (50 psi)	6700-1296-907	6700-1319-907
GR (5 bar)	6700-1401-907	6700-1405-907

2.3.2 Air Flowmeter

Part numbers below are for Air Twin Flowmeters with
1/8” NPTF “Y” adapter and standard O_2 DISS fitting.

INTL (414 kPa)	6700-1298-907
GR (5 bar)	6700-1403-907

Part numbers below are for Oxygen Twin Flowmeters with power outlet, 1/8” NPTF “Y” adapter and standard O_2 DISS fitting (Air Twin Flowmeters are not available).

	0 - 15 l/min	0 - 3.5 l/min
NA (50 psi)	6700-1263-907	6700-1308-907

* For other Oxygen configurations, see the “Flowmeter Options” section.

Notes

3/Descriptions and Specifications

3.1 Description

3.1.1 Oxygen and Air Pressure Compensated Flowmeters (0 - 15) l/min

The Ohio Medical Pressure Compensated Flowmeter provides accurate gas flow measurement and control within a range of 0 to 15 liters per minute for use in a variety of respiratory therapy gas delivery systems.

The Ohio Medical flowmeter was designed to meet strict precision and durability standards. The manifold is constructed of solid brass. The flow control valve assembly consists of a precision needle valve threaded into a brass seat for extended resistance to wear and corrosion. Flowtubes feature large, easy to read increments with an expanded 0 to 5 l/min range for improved readability at low flows. The flowtube and shroud components are made of clear, impact resistant polycarbonate and offer a lifetime warranty.

Flowmeters are available for oxygen and air at supply pressures of 50 psi, 414 kPa (60 psi) and 5 bar (72.5 psi). They may be ordered with a variety of options including wall outlet adapters/probes, DISS power outlets or in twin flowmeter configurations. A plastic nut and gland DISS tubing nipple is also optional.

3.1.2 Oxygen Lo-Flo 3.5 Flowmeter

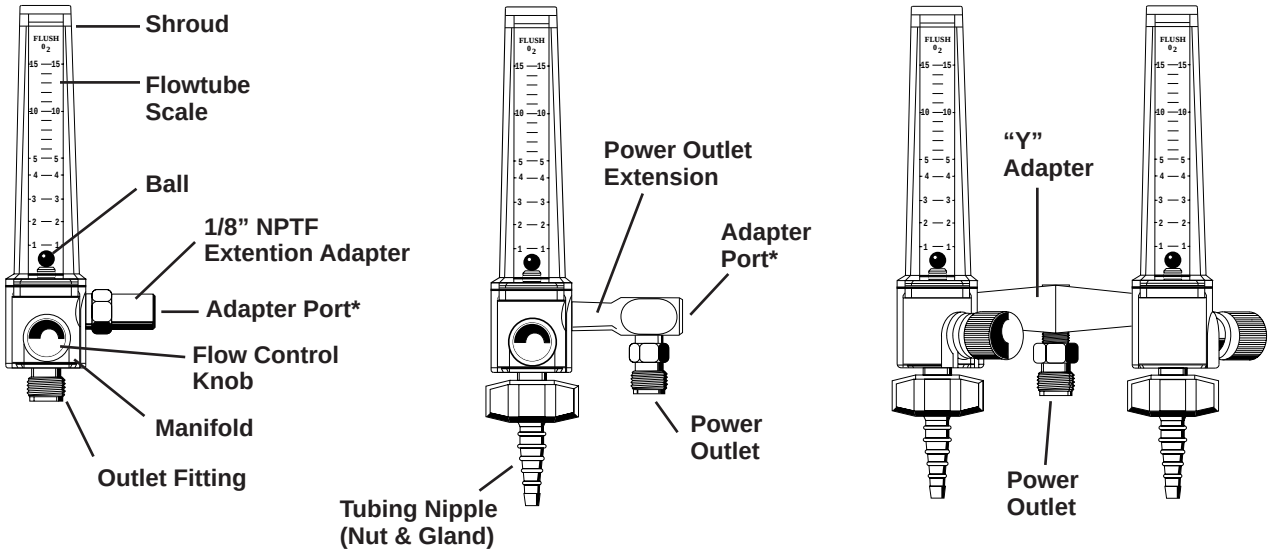
The Ohio Medical Lo-Flo 3.5 Flowmeter has an indicating range of 0 - 3.5 liters per minute (l/min) with a flow limit less than 5 l/min maximum. It provides accurate gas flow measurement for use in pediatric/neonatal and any other low flow applications. This specialized flowmeter has been differentiated by the “0 - 3.5 l/min” designation on both the manifold label and flowtube.

⚠WARNING: The Lo-Flo 3.5 is not to be used on patients reguiring more than 3.5 l/min of oxygen. The Lo-Flo 3.5 flowmeter is not for resuscitation. 5 l/min maximum.

⚠WARNING: Use the Lo-Flo 3.5 flowtube and ball supplied together as a set when replacing the existing tube or ball in the Lo-Flo 3.5 flowmeter, and use only with a Lo-Flo 3.5 mainfold (containing flow limiting orifice).

3.1.3 Twin Flowmeter

The Ohio Medical Twin Flowmeter consists of two Ohio Medical pressure compensated flowmeters mounted onto a metal, electropolished “Y” adapter. This unique one-piece adapter does not have joints, providing maximum flow efficiency and eliminating loosening and leaks associated with jointed twin adapters. It is compact in design yet can accommodate two patient delivery systems when necessary. Twin flowmeter options include various wall outlet adapters/probes, a power outlet and a plastic nut and gland DISS tubing nipple on each of the flowmeter outlets.



* For inlet adapter.

Adapter port	Supply gas adapters are connected here (gas inlet)
Ball	Indicates flow rate by reading at center of ball
Extention Adapter	1/8” NPT male to 1/8” NPTF
Flow Control Knob	Knurled knob that regulates the flow rate through the flowmeter
Flowtube Scale	Flow rate increments are shown in l/min
Manifold	Locates and holds the inlet adapter, flowtube, shroud, flow control valve assembly outlet fitting port
Outlet Fitting Port	Outlet fittings to supply metered gas to a therapy device connected here (gas outlet)
Power Outlet Extention	1/8” NPT male to 1/8” NPTF with provision for the power outlet
Power Outlet (Power Take-Off)	Check valve that provides gas at line pressure
Shroud	Maintains gas pressure around flowtube
Tubing Nipple	O_2 DISS (Female) wing nut and gland for patient tubing connection
“Y” Adapter	Two 1/8” NPT male fittings to 1/8” NPTF, connects two (2) flowmeters for use on a single gas source

Note: For complete parts breakdown, see the “Service - Disassembly and Assembly” section.

3.2 Specifications

Gas Supply:	Oxygen or air, as specified on the flowmeter label and flowtube	
Calibration Pressure and Temperature:	50 psig (320 kPA) and 70°F (21°C), 414 kPa (60 psig) and 21°C (70°F), or 5 bar (72.5 psig) and 21°C (70°F) as specified on the flowmeter label	
Maximum Pressure:	100 psig (690 kPa)	
	<u>0 - 15 l/min</u>	**<u>0 - 3.5 l/min</u>**
Flow Increments:	1/2 l/min increments from 1 to 5, 1 l/min increments from 5 to 15	NA & CAN (50 psi), GR (5 bar) 1/8 l/min increments from 1/4 to 1, 1/2 l/min increments from 1 to 3.5 INTL (414 kPa) 1/4 l/min increments from 1/4 to 1, 1/2 l/min increments from 1 to 3.5
Accuracy:	± 1/4 l/min between 1 and 2.5 l/min; ± 10% of reading between 2.5 and 15 l/min at calibration pressure and temperature in vertical orientation	±1/8 l/min between 1/4 and 3.5 l/min
Minimum “FLUSH” Flow Rate	65 l/min with adequate supply	3.5 l/min
Maximum Flow Rate	greater than 65 l/min with adequate supply	less than 5 l/min
Outlet Flow Rate: (Power Outlet Models ONLY)	Minimum 150 l/min with adequate supply flow	

3/Descriptions and Specifications

⚠**WARNING:**	**On models with a power outlet, the supply pressure at the flowmeter will decrease during periods of high flow from the power outlet. This will cause a decrease in flowmeter accuracy. The actual flow from the flowmeter outlet will be lower than that indicated. For example, with 150 l/min flowing from the power outlet, the supply pressure drops from 50 psi to 46 psi and the actual flow from the flowmeter is then lower than indicated by up to 20%.**
Leakage:	No more than 5 psi (34.5 kPa) drop in 5 minutes (from 50 psig) with inlet and outlet sealed and flow control knob fully open counter clockwise.
Inlet Adapter Port:	1/8”-27 NPTF (tapered thread) basic model without adapter/probe (Standard wall adapters available; see “Fittings and Adapters” section.)
Outlet Fitting Port:	Oxygen or air DISS male (For fittings, see “Fittings and Adapters” section.)

	PC Flowmeter	**Twin PC Flowmeter (0 - 15 & 0 - 3.5 l/min)**
Weight: *	8 oz (230 grams)	1 lb 2 oz (510 grams)
Dimensions: *	Height: 6.0 in (152 mm) Width: 2.2 in (56 mm) Depth: 2.3 in (58 mm)	6.0 in (152 mm) 5.1 in (130 mm) 3.6 in (91 mm)
Package Dimensions:	Height: 8.0 in (203 mm) Width: 3.0 in (76 mm) Depth: 4.3 in (109 mm)	10.5 in (267 mm) 7.8 in (198 mm) 6.5 in (165 mm)

(*) Less fittings and adapters

Notes

4.1 Equipment Set-Up

⚠WARNING: Do not use a flowmeter with any cracked or damaged plastic components, gas leaks, loose fittings or knobs, or any missing components. Supply gas pressure can cause parts to be expelled and injury may occur.

⚠WARNING: Make sure the inlet adapter is properly seated in the flowmeter shroud. If only the adapter threads are inside the shroud inlet hole, cracking and leakage may occur under pressure.

⚠WARNING: Do not connect flowmeter to supply pressures in excess of 72.5 psi (5 bar). Excess supply pressure can cause parts to be expelled and injury may occur.

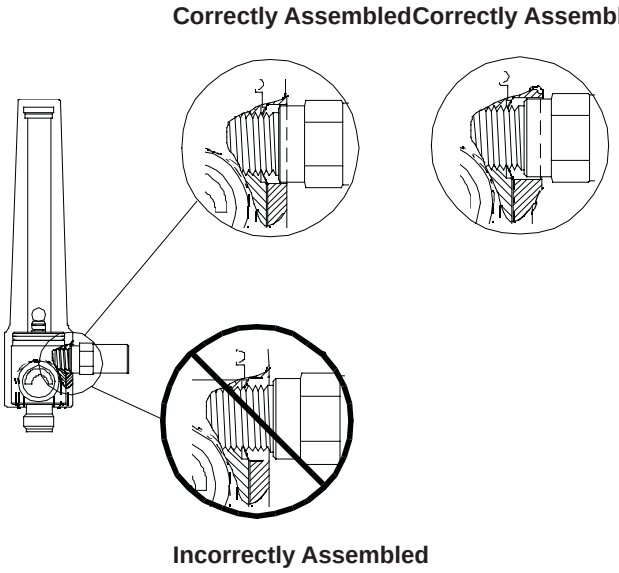
⚠WARNING: The flowmeter is only intended for the gas specified on the flowmeter label. Do not use the flowmeter with any other gases. Inaccurate flow indications and patient injury may result.

⚠WARNING: The flowmeter is calibrated using the gas supply pressure and temperature shown on the flowmeter label. Varying pressure, temperature or both will reduce accuracy.

⚠WARNING: Power outlet models ONLY - Connect the high pressure hose to the therapy device before making the connection to the flowmeter power outlet.

If the flowmeter is equipped with an inlet adapter, insert the adapter into an appropriate oxygen or air gas supply outlet as shown on the flowmeter label. If the flowmeter is to be mounted elsewhere, connect the appropriate gas supply to the adapter port.

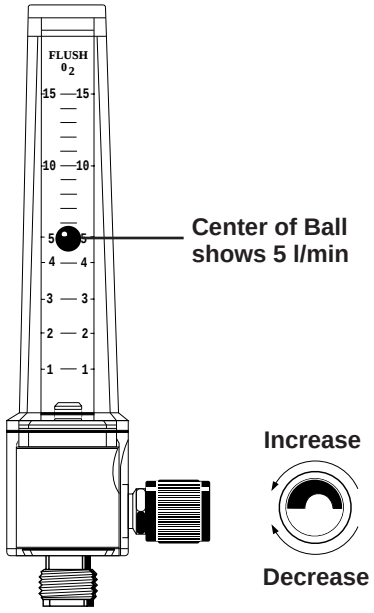
Important: Ensure the flowmeter is securely mounted or locked into the supply gas outlet. The flowmeter must be positioned vertically to ensure maximum accuracy.



4.2 Setting the Flow Rate

Rotate the flow control knob counter-clockwise (CCW) to increase flow or clockwise (CW) to decrease flow. Flow rate in liters per minute is indicated by aligning the CENTER of the ball with the scale increments on the flowtube. Flow rates on the twin pressure compensated flowmeters can be adjusted independently.

Flow rate may change with a change in downstream resistance (backpressure at the therapy device). This change may be compensated for, without accuracy loss, by simply re-adjusting the flow rate.

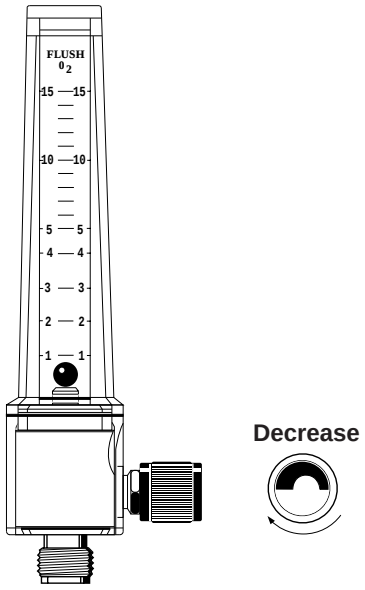


4.3 Pre-Use Checkout Procedure

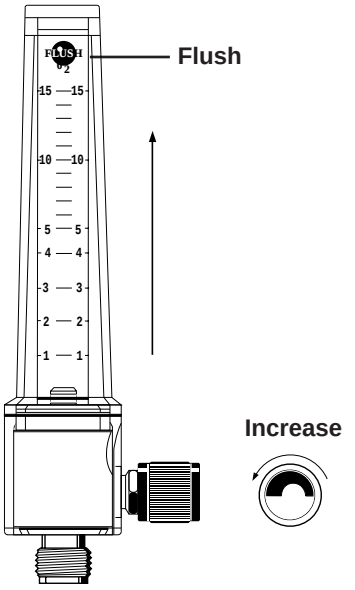
⚠CAUTION: Do not use excessive force when closing the flow control knob. This may cause a decrease in valve life.

The Pre-Use Checkout Procedure must be performed before using this equipment on each patient. Do not connect the flowmeter to the therapy device until this procedure is completed. All tests must be performed with the appropriate gas supply as shown on the flowmeter label. There should be no leaks.

1. Rotate the flow control knob clockwise (decrease) to shut off the flow. The ball should rest at the bottom of the flow tube and not move.



2. Rotate the flow control knob counter-clockwise (increase). The ball should rise immediately after rotation is begun, and rise smoothly and steadily with continued clockwise rotation of the flow control knob. When a desired flow is set, the ball should maintain a steady position.
3. Rotate the flow control knob counter-clockwise (increase) until the ball reaches the top of the flowtube. Continue to rotate the flow control knob counter-clockwise (increase). In the 0 - 15 l/min model, listen and feel for a large increase in delivered gas flow. In the 0 - 3.5 l/min model, there should be little change in sound and feel when the flow control knob is fully opened.



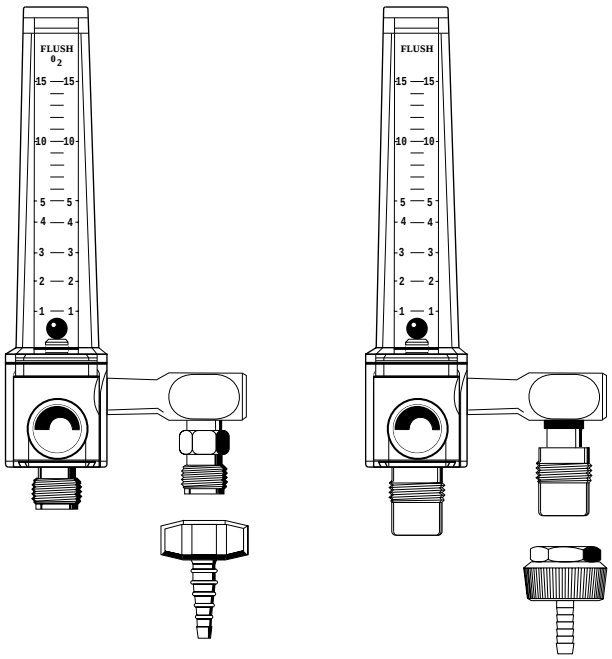
4. Rotate the flow control knob clockwise (decrease) to shut off the flow.

5. Power Outlet models ONLY:

   ⚠**WARNING: Tubing nipple connection to the power outlet is for the Pre-Use Checkout Procedure ONLY, NOT for therapy use.**

   a. Attach an appropriate oxygen or air tubing nipple to the power outlet fitting. Gas will escape while connection is made. Gas must flow freely.

   b. Remove the tubing nipple. Gas flow must stop and there should be no leaks.



4.4 Patient Setup

1. If not previously done, connect the flowmeter adapter to the appropriate gas supply.
2. Make sure the Pre-Use Checkout Procedure has been performed.
3. Attach a therapy device or a nut and gland tubing adapter to the fitting port of the flowmeter. Attach connective tubing.

   Note: On power outlet models ONLY, gas will escape momentarily while the connection is made.

   ⚠**WARNING: Power outlet models ONLY - Connect the high pressure hose to the therapy device before making the connection to the flowmeter power outlet.**

4. Check all connections for leaks and retighten them securely as required.
5. Rotate the flow control knob until the CENTER of the ball aligns with the desired flow rate on the flowtube.
6. Follow hospital protocol to begin therapy.

Notes

5/Cleaning and Sterilization

5.1 Cleaning

⚠WARNING: After patient use, oxygen therapy equipment may be contaminated. Handle in accordance with your hospital's infection control policy.

⚠WARNING: Use of lubricants, solvents or cleansers other than recommended, may degrade plastic or rubber components.

5.1.1 Routine Exterior Cleaning

The flowmeter may be externally cleaned using a solution of water and a mild detergent.

5.1.2 Internal Component Cleaning

1. Refer to the "Service - Disassembly and Assembly" section for instructions.
2. Clean all plastic and glass components with a solution of warm water and mild detergent. Clean all metal components with alcohol.

   ⚠WARNING: Do not enlarge the Lo-Flo 3.5 Flow-meter flow limiting orifice by mechanical cleaning.

   ⚠CAUTION: Avoid scratching the inner bore of the flowtube when cleaning; a soft cotton swab may be used.
3. Allow all components to air dry before assembly.

5.2 Sterilization

⚠WARNING: Routine cleaning with certain disinfectants or liquid sterilizing agents may cause deterioration and cracking of the plastic components, ultimately leading to equipment failure and possible patient or operator injury. Therefore periodic visual inspection of these parts is extremely important.

⚠CAUTION: Do not steam autoclave or liquid sterilize flowmeter. Severe impairment to the operation of the flowmeter will result. The only acceptable method of sterilization is with gas (ethylene oxide).

⚠CAUTION: Sterilization with ethylene oxide mixtures may cause crazing (minute superficial cracking) of some plastic parts. Crazing will be more pronounced when mixtures containing Freon® are used.

1. The flowmeter should only be sterilized if it is contaminated or maintenance is to be performed. Sterilization is not recommended as a standard procedure after each use.
2. The flowmeter should be sterilized with the flow control knob opened fully CCW (increase).
3. The only acceptable method of sterilization is with ethylene oxide. Ethylene oxide mixtures can be used at temperatures of 125 to 135 °F (52 - 57 °C). If this temperature cannot be obtained, room temperature sterilization with 100% ethylene oxide can also be used.

   ⚠WARNING: Following sterilization with ethylene oxide, parts should be quarantined in a well ventilated area to allow dissipation of residual ethylene oxide gas absorbed by the material. Follow sterilizer manufacturer's recommendations for specific aeration periods required.
4. After each sterilization check the operation of the flowmeter by performing the Pre-Use Checkout Procedure.

Notes

6/Troubleshooting

Problem	Possible Causes	Remedy (*)
A. No gas flow is being delivered	1. Gas supply depleted	1. Replenish gas supply
	2. Adapter connection not made	2. Reconnect adapter
	3. Malfunctioning adapter	3. Replace adapter
	4. Supply or gas outlet obstructed	4. Repair obstructed outlet
	5. Outlet fitting obstructed	5. Replace fitting
	6. Knob loose on valve	6. Tighten knob set screws or replace with new knob
	7. Patient circuit obstructed	7. Clear obstruction
B. Ball will not rise to desired setting	1. Inlet screen blocked	1. Clean/replace inlet screen
	2. Flow limitting orifice blocked in 3.5 l/min model	2. Clean/clear blockage
C. Flow will not shut off	1. Knob loose on valve	1. Tighten knob set screws or replace with new knob
	2. Valve seat o-ring damaged	2. Replace o-ring
	3. Valve seat damaged	3. Replace valve assembly
D. Unstable or inaccurate pressure and temperature	1. Improper supply gas type, flowrate indications	1. Correct gas supply type, pressure, or temperature
	2. Non-vertical flowmeter position	2. Mount flowmeter vertically
	3. Sticking ball	3. Replace flowtube and ball
	4. Dirt in flowtube	4. Clean or replace tube, ball, and inlet filter screen
	5. Leaking or loose valve assembly	5. Replace leaking valve, tighten valve assembly securely
	6. Cap nut loose	6. Tighten cap nut
	7. Static buildup	7. Check grounding of wall outlets, increase humidity of room air, disassemble and clean flowmeter components
	8. Leaking o-rings	8. Replace o-rings
	9. Leaking or loose adapter	9. Remove adapter, apply sealant and tighten adapter securely
	10. Leaking shroud (adapter engagement)	10. Ensure half-inch shoulder diameter on adapter is inside the inlet hole on shroud when tightened securely. If not and the existing shroud does not have a raised inlet hole rim, order a new shroud.

(*) See detailed instructins in the “Service - Dissassembly and Assembly” section

Problem	Possible Causes	Remedy (*)
E. External leakage	1. Power outlet leaking	1. Clean valve piston and seat and replace o-rings
	2. Damaged o-rings	2. Replace o-rings
	3. Damaged plastic components	3. Replace components
	4. Loose adapter	4. Remove adapter, apply sealant and tighten adapter securely
	5. Leaking shroud (adapter engagement)	5. Ensure half-inch shoulder diameter on adapter is inside the inlet hole on shroud when tightened securely. If not and the existing shroud does not have a raised inlet hole rim, order a new shroud.
F. Loose knob	1. Rough handling	1. Tighten knob set screws or replace with new knob
	2. Loose or missing set screws	2. Replace knob
	3. Broken knob	3. Replace knob

7.1 Service Tools and Equipment

⚠WARNING: Never use any petroleum-based lubricants in an oxygen environment, as these materials are highly combustible in the presence of oxygen. The only oxygen service lubricants recommended for this equipment are Sentinel® OPG or Ball Vac-Kote® 37951M.

⚠CAUTION: Do not use any Loctite® (or any product which contains methacrylate ester) on any part of the flowmeter or connected fittings. Loctite® may damage plastic components.

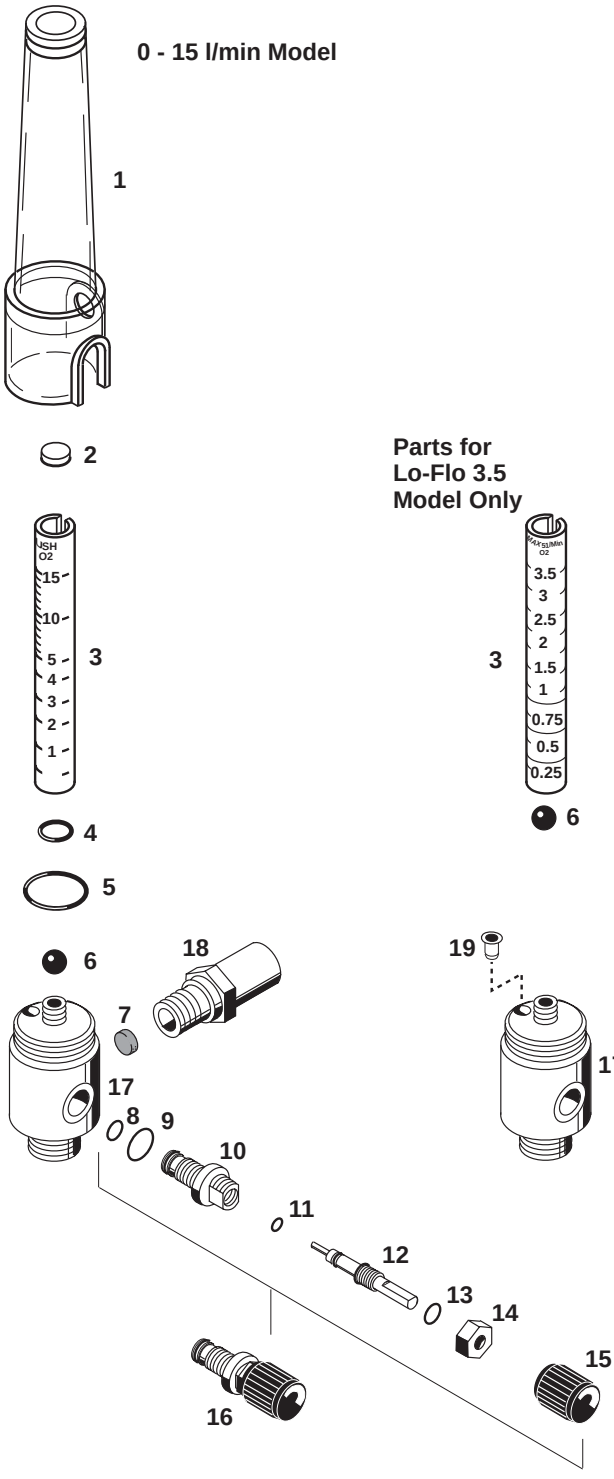
⚠CAUTION: Use of lubricants, solvents or cleansers other than recommended, may degrade plastic or rubber components.

- Open end adjustable wrenches (spanners): 6” (150 mm) and 10” (250 mm) handles
- Open end wrenches (spanners): 1/2”, 9/16” and 3/4”
- Hex key: 1/16”
- Wooden toothpick (to remove o-rings)
- Cotton swabs
- Pressure gauge: 100 psi, ± 2% FSD accuracy
- Supply gas shut off valve:
  gas tight valve (Ohio Medical # 207-6023-300)
- Flow calibration tester: 0 to 5 l/min*, 0 to 20 l/min and 0 to 65 l/min scales, ± 2% FSD accuracy
- Bubble Leak Tester (See figure this section)
- Oxygen service lubricants:
  Sentinal® OPG (Ohio Medical # 6700-0067-200) or Ball Vac-Kote® (Ohio Medical # 0220-0091-300)
- Oxygen service pipe thread sealant:
  [6] Lox-8™ paste (Ohio Medical # 6700-0069-200) or Teflon® (PTFE) pipe sealant tape.
- Torque wrench (spanner): 0 to 20 in-lb (0 to 1.2 N-m) with 1/2” hex socket, 0 to 20 ft-lb (0 to 15 N-m)
- Nut and gland tubing adapters:

  O_2 DISS - Ohio Medical # 0204-8811-800
  Air DISS - Ohio Medical # 6700-0159-700
- Hex nuts:
  O_2 DISS - Ohio Medical # 6700-0127-400
  Air DISS - Ohio Medical # 0204-6602-535
- Screwdriver: medium sized flat blade

* This range required for 0 - 3.5 l/min model only.

[6] Lox-8 is a trademark of Fluoramics Inc.



Description

1. Shroud
2. Disc Pad, 1/2” Dia., 1/4” Thick
3. Flowtube
4. O-ring, .125” ID, .250” OD, .062” W
5. O-ring, 13/16” ID, 15/16” OD, 1/16” W
6. Black Glass Ball, 1/4” Dia.
7. Inlet Screen
8. O-ring, 5/32” ID, 9/32” OD, 1/16” W
9. O-ring, .375” ID, .500” OD, .062” W
10. Flow Control Valve Seat
11. O-ring, 5/64” ID, 13/64” OD, 1/16” W
12. Flow Control Valve (Needle Valve)
13. Teflon O-ring, 3/16” ID, 5/16” OD
14. Flow Control Valve Cap End
15. Flow Control Knob
16. Flow Control Knob Valve and Seat Assembly
17. Manifold
18. Extension Adapter
19. Flow Limiting Orifice (0 - 3.5 l/min model)
20. Warning Tag (0 - 3.5 l/min model)

⚠WARNING: Use the Lo-Flo 3.5 flowtube and ball supplied together as a set when replacing the existing tube or ball in the Lo-Flo 3.5 Flowmeter, and use only with a Lo-Flo 3.5 manifold (containing flow limiting orifice).

7.2 Disassembly

⚠WARNING: If the flowmeter is repaired or disassembled in any manner, the Service Checkout Procedure must be performed before returning the equipment to service.

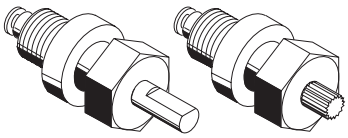
⚠WARNING: Clean and sterilize any flowmeter that may be contaminated before disassembly to ensure service personnel are not exposed to hazardous contamination.

⚠WARNING: Prior to any servicing, disconnect the flowmeter from the gas supply.

7.2.1 Flow Control Valve - Disassembly

1. Remove flowmeter from gas supply.
2. Turn flow control knob CCW (increase) to expose
   the cap nut.
3. For knobs **with** set screws: with 1/16” hex key loosen CCW knob set screws and remove knob from valve stem.

   For knobs **without** set screws: pry off the knob by placing a flat screw driver between the cap nut and the knob.



   Note: If the flowmeter has a knurled flow control valve shaft it must be replaced by a new flow control valve assembly. Remove by following steps 4 and 5.
4. With 1/2” wrench loosen CCW and remove the cap nut. On Lo-Flo model remove warning tag.
5. Turn CCW the flow control valve stem to remove from unit.
6. With 6”(150mm) adjustable wrench on flats of valve seat, loosen CCW and remove seat.
7. All o-rings are now accessible for inspection and replacement.

7.2.2 Flow Control Valve - Reassembly

For installation of a replacement flow control valve assembly follow steps 1 and 2. If servicing valve only, skip to step 3.

1. Remove knob. (See the “Flow Control Valve Disassembly” section)
2. Remove cap nut.
3. Lubricate o-rings with a small amount of Sentinel® OPG or Ball Vac-Kote® (O_2 service lubricants).
4. Screw valve seat (with stem and Teflon® (PTFE) o-ring) into manifold. Tighten securely with 6” (150mm) adjustable wrench on the flats of the seat.

   ⚠WARNING: If the valve seat is not tightened securely to the manifold it may loosen during normal use. This may cause the set flow to vary or be cut off.

   Important: It is recommended that the Teflon® (PTFE) o-ring be replaced when servicing the valve assembly.
5. Thread in the valve stem and turn fully clockwise. On the Lo-Flo model, install the warning tag over the threads on the valve seat. Install the cap nut over the valve stem and Teflon® (PTFE) o-ring. Use torque wrench and 1/2” socket to tighten cap nut to 15-20 in-lb torque. If torque wrench is not available, tighten cap nut FINGER tight, then with 1/2” wrench tighten cap nut:

   a. New Teflon® (PTFE) o-ring - 3/4 to 1 turn past FINGER tight

   b. Used Teflon® (PTFE) o-ring - 1/4 to 3/8 of a turn past finger tight

   ⚠CAUTION: Over-tightening cap nut may cause
   it to crack.
6. Knob Installation:

   a. Set screw knob - With set screws loose, slip knob over stem until it bottoms. Align one set screw onto flat of stem, and gently tighten using 1/16” hex key. Gently tighten second set screw, then securely tighten both set screws.

   b. Push-on knob - Align knob so that flat on knob coincides with flat on stem and push on securely by hand until it bottoms.

7.2.3 Flowmeter - Disassembly

1. Remove flowmeter from gas supply.
2. Remove inlet adapter(s) from the flowmeter manifold (CCW).
3. Remove flow control valve assembly (See the “Flow Control Valve Disassembly” section).
4. Attach a DISS hex nut to flowmeter outlet and clamp hex nut in vice. Carefully pull shroud to separate from manifold.

   Note: Ball may fall out of flowtube. Prevent ball from being scratched, getting dirty, or being lost. Ensure that the flowtube and ball as supplied are kept as a matched set.
5. Remove flowtube and ball from manifold.

   O-rings, inlet screen and disc pad are now accessible.
6. Inspect all components and replace as required.

   Important: It is recommended that the filter screen be replaced if it is removed from the manifold.

7.2.4 Flowmeter - Reassembly

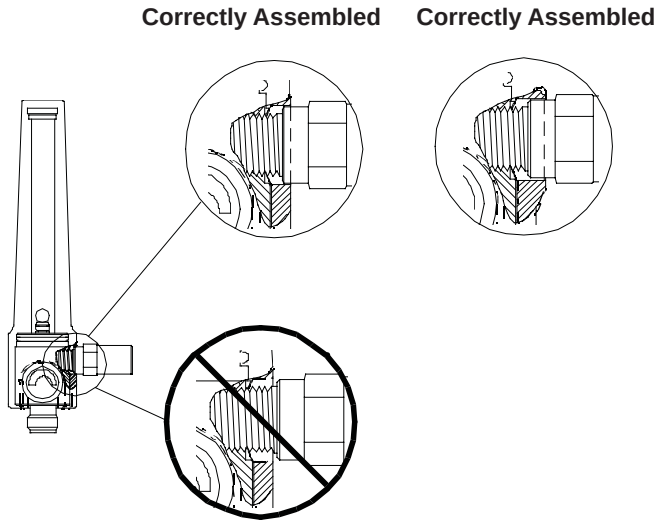
1. Clean all components according to the cleaning section and dry with a clean, lint free cloth and dry medical air or oxygen.
2. Clean Lo-Flo 3.5 flow limiting orifice by back-flushing with dry medical air or oxygen.

   ⚠WARNING: Do not enlarge the Lo-Flo 3.5 flowmeter flow limiting orifice by mechanical cleaning.
3. Lubricate o-rings with a small amount of Sentinel® OPG or Ball Vac-Kote® O_2 service lubricants.
4. Ensure inlet screen is installed straight (not cocked) in the manifold inlet port, covering the hole leading to the flowtube. When installing a new screen, a 5/32" diameter or smaller dowel (cleaned and suitable for low pressure oxygen service) may be used to push squarely on the center of new screen.

   ⚠WARNING: Make sure that the hole in the manifold leading to the flowtube is covered after the inlet screen is installed.
5. Ensure that disc pad is positioned inside top of shroud.
6. The Lo-Flo 3.5 manifold is different from the 0 - 15 l/min version as it contains a restrictor orifice limiting flow to 5 l/min. Ensure that a Lo-Flo 3.5 flowtube and ball as supplied are installed onto a Lo-Flo 3.5 manifold. Each component is labeled as such to facilitate matching.
7. Place flowtube over small manifold o-ring. Align tube markings right side up and facing front on the manifold. (The inlet port is at the rear of the manifold.)
8. Ensure ball is clean and free of all lubricant and dirt. Drop ball into top of flowtube.
9. Align holes of shroud with corresponding holes in manifold, and press shroud onto manifold by hand. Be sure that the slot on top of flowtube engages key inside top of shroud, and the shroud is set completely down on the manifold.

   ⚠CAUTION: Do not use any Loctite® (or any product which contains methacrylate ester) on any part of the flowmeter or connected fittings. Loctite® may damage plastic components.
10. Apply a small amount of Lox-8™ paste or Teflon® (PTFE) pipe sealant tape to pipe threads of inlet adapter and install it in the manifold. Tighten adapter securely (minimum torque of 8 ft lbs). Continue tightening to align adapter so that the flowmeter is vertical during use. See Appendix A.1 and A.2 for additional information on installation of adapters.

    ⚠WARNING: Make sure the inlet adapter is properly seated in the flowmeter shroud. If only the adapter threads are inside the shroud inlet hole, cracking and leakage may occur under pressure.



7.2.5 Power Outlet - Disassembly

1. Remove flowmeter from gas supply.
2. Loosen and remove power outlet body from power outlet extension or “Y” adapter with adjustable wrench (CCW).
3. Remove piston o-ring and piston from power outlet body. Remove body o-ring if present.
4. Clean all components according to the cleaning section and replace o-rings as required.

7.2.6 Power Outlet - Reassembly

1. Use new o-rings as required.
2. Lubricate o-rings with a small amount of Sentinel® OPG or Ball Vac-Kote® O_2 service lubricant.
3. Install piston in power outlet body.
4. Install small o-ring on piston.

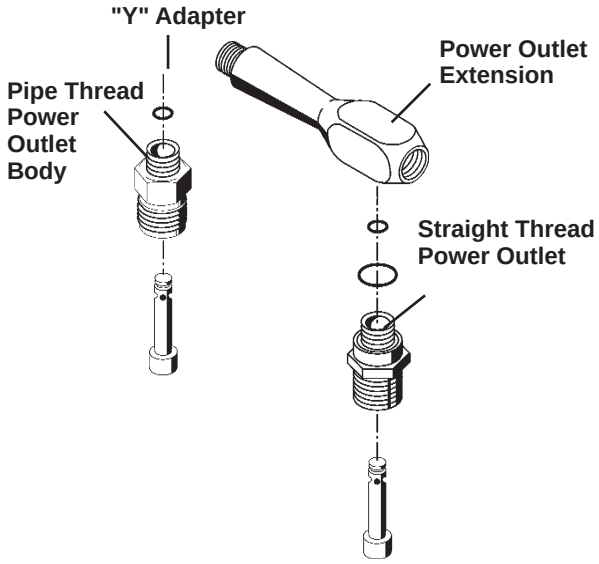
5a. For straight thread power outlet body ONLY used in power outlet extension:

- Install large o-ring
- Hand thread power outlet into power outlet extension and securely tighten with wrench.

⚠CAUTION: Do not over-tighten straight thread power outlet body; body may crack and cause leaks. O-ring seals body to the extension.

5b. For pipe thread power outlet body ONLY used in "Y" adapter:

- Apply a small amount of Lox-8™ paste or Teflon® (PTFE) pipe sealant tape to threads of power outlet body and thread by hand.
- Torque power outlet body to “Y” adapter to 10 ft-lbs.

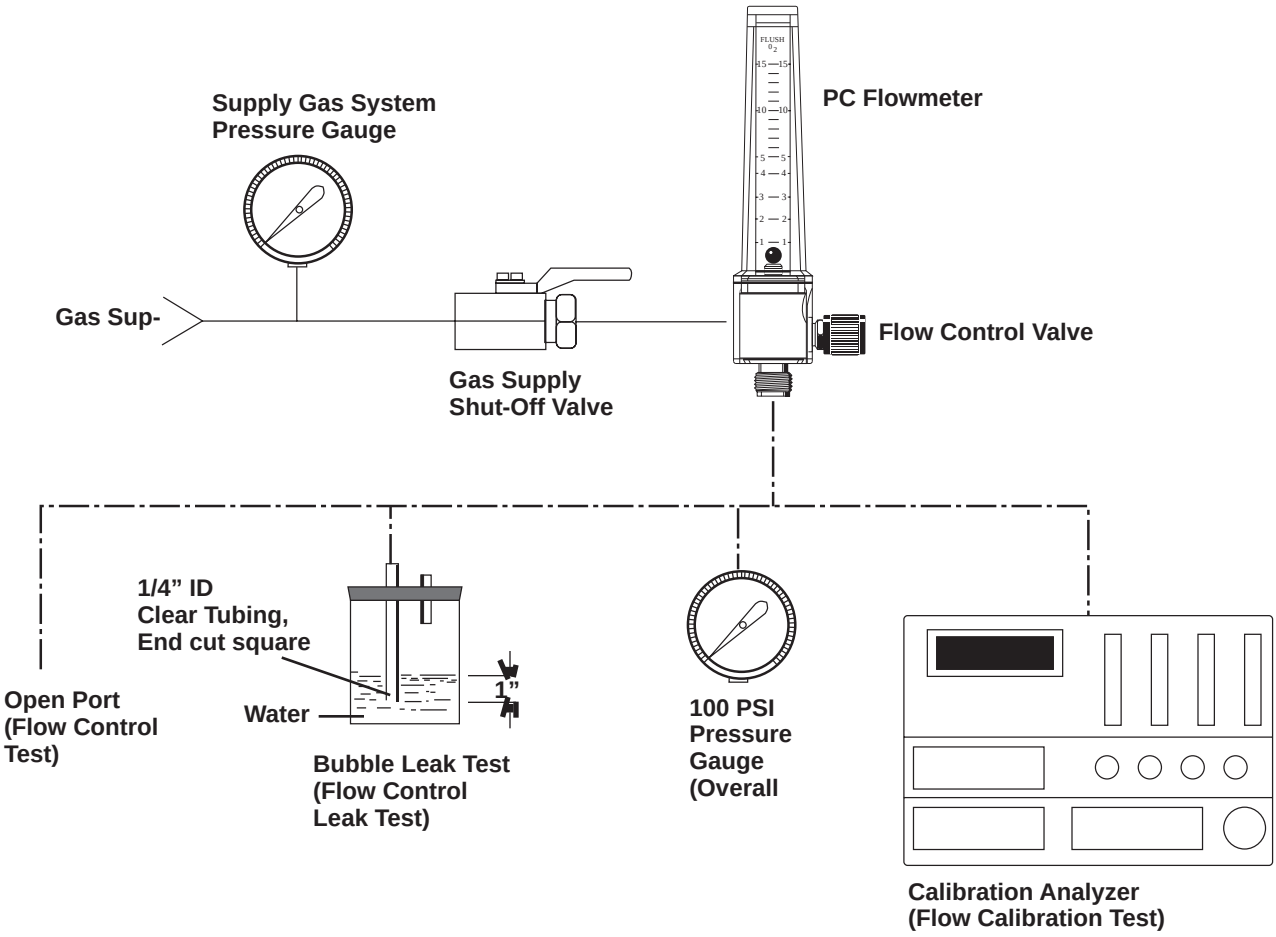


Notes

8/Service Checkout Procedure

8.1 Set-up

Note: If the flowmeter fails any of the following tests, refer to the “Troubleshooting” section.



8.1.1 Equipment

1. Connect flowmeter to appropriate gas supply. The flowmeter must be mounted vertically.
2. Assemble test set-up as shown above.

8.1.2 Gas supply flow rate and pressure check

1. Supply gas type, pressure and temperature must match that shown on the flowmeter label.
2. With a 0 - 15 l/min flowmeter fully opened CCW, check that gas supply provides a minimum of 65 l/min flow rate. (Not required if testing 0 - 3.5 l/min model).
3. Verify that gas supply pressure does not change more than 2 psi when flow is adjusted over the full reading range.

8.2 Flow Control Test

1. Ensure gas supply shut-off valve is closed.
2. Shut off flow control valve fully CW on flowmeter.
3. Fully open gas supply shut-off valve.
4. Slowly open flow control valve CCW. The ball should rise immediately after valve rotation is begun, and rise smoothly and steadily with continued CCW rotation of the flow control knob.
5. Set a flow rate.
6. Observe that the ball maintains a steady position for several minutes.

   Note: Variations in gas supply pressure will vary the position of the ball.
7. Close gas supply shut-off valve.

8.3 Flow Control Valve Leak Test

1. Ensure gas supply shut-off valve is closed.
2. Set up bubble leak tester as shown in figure above.
3. Turn flow control knob fully clockwise (decrease) until it seats.
4. Fully open gas supply shut-off valve.
5. Look for bubbles in bubble trap. No more than six bubbles in 30 seconds should appear in the bubble trap. If more than six bubbles ap-pear, check that the flow control valve is fully CW; oth-erwise, refer to the “Troubleshooting” section.
6. Close gas supply shut-off valve.
7. Remove bubble leak tester.

8.4 Overall Leak Test

1. Ensure gas supply shut-off valve is closed.
2. Securely attach leak test pressure gauge (100 psig) to flowmeter outlet fitting as shown in figure above. Ensure gas supply shut-off valve and leak test pressure gauge connections are leak free. A soap or leak detection solution can be used to detect leaks at pipe connections.
3. Fully open gas supply shut off valve and fully open flow control valve. Leak test pressure gauge should show supply pressure of 50 psig.
4. Close gas supply shut-off valve and immediately read leak test pressure gauge.
5. Observe that leak test pressure gauge does not drop more than 5 psig in 5 minutes.
6. Close gas supply shut-off valve and remove leak test pressure gauge.

8.5 Flow Calibration Test

1. Ensure gas supply shut-off valve is closed.
2. Connect flow calibration tester to flowmeter outlet and set flow calibration tester on appropriate range for the flowmeter being tested and gas being used. Ensure the calibration tester is “ze-roed”.
3. Open gas supply shut-off valve.
4. Set the correct supply pressure as shown on the flowmeter label (50 psig ± .5 psig or 414 kPa ± 4 kPa) at the maximum flow mark shown on the flowtube.
5. Verify that gas supply pressure does not change more than 2 psi when flow is adjusted over the full reading range.
6. For each flowmeter indication point listed in the appropriate flow calibration table below, adjust the flowmeter so the CENTER of the ball is oppo-site the selected test point. The calibration tester reading should be between the limits shown for the selected point.
7. Close gas supply shut-off valve.

8.5.1 Flow Calibration Test Table (0 - 15 l/min)

Flowmeter Indication	Calibration Tester Reading	
	Lower Limit	Upper Limit
l/min	l/min	l/min
1	0.75	1.25
3	2.70	3.30
5	4.50	5.50
10	9.00	11.00
15	13.50	16.50

8.5.2 Flow Calibration Test Table (0 - 3.5 l/min)

Flowmeter Indication	Calibration Tester Reading	
	Lower Limit	Upper Limit
l/min	l/min	l/min
0.5	.375	.625
1.5	1.375	1.625
3.5	3.375	3.625

8.6 Max Flow Test

1. Ensure gas supply valve is closed.
2. Connect flow calibration tester to flowmeter outlet and set the tester for the appropriate gas and test range.
3. Open gas supply shut off valve.
4. Open flow control valve counterclockwise all the way.
5. The reading on the calibration tester should be between the limits shown in Table 8.6.1 for the appropriate model flowmeter.
6. Close gas supply shut off valve.

8.6.1 Max Flow Limits Table

Model	Lower Limit	Upper Limit
	l/min	l/min
0 - 15 l/min	65	N/A
0 - 3.5 l/min	3.5	5.0

9/Maintenance

9.1 General Maintenance of Oxygen Therapy Equipment

⚠WARNING: The Pre-Use Checkout Procedure must be performed before using this equipment on each patient. If the flowmeter fails any part of the Pre-Use Checkout Procedure, it must be removed from service and repaired by qualified service personnel.

⚠WARNING: Clean and sterilize all oxygen therapy equipment if contaminated before disassembly, to ensure service personnel are not exposed to hazardous contamination.

⚠WARNING: Do not allow oxygen or oxygen equipment to be exposed to fire, sparks, or electrical equipment which may provide a source of ignition. DO NOT SMOKE IN THE AREA WHERE OXYGEN IS IN USE.

⚠CAUTION: Flowmeters should be kept in use or used on a rotating basis. Unused equipment may tend to deteriorate.

9.2 Recommended Maintenance Schedule

In addition to performing the Pre-Use Checkout Procedure before patient use, the following periodic maintenance should be performed:

Item	Minimum Frequency
Visual Inspection (Including orifice for Lo-Flo 3.5)	Every 3 months
Service Check-out Procedure	Every 6 months
Component Inspection, cleaning according to section 5.1 and o-ring replacement	Every 24 months

9.3 Repair Policy

⚠WARNING: Clean and sterilize all respiratory equipment before shipment or service to ensure transportation personnel and/or service personnel are not exposed to any hazardous contamination.

⚠CAUTION: Do not steam autoclave or liquid sterilize flowmeters. Severe impairment to the operation of the flowmeter will result. The only acceptable method of sterilization is with gas (ethylene oxide).

⚠CAUTION: Only competent individuals trained in the repair of this equipment should attempt to service it.

Do not use malfunctioning equipment. Make all necessary repairs. Have the equipment repaired by qualified service personnel or by Ohmeda Medical. Parts listed in the service manual for this product may be repaired or replaced by a competent, trained person who has experience in repairing devices of this nature. After repair, perform the Service Checkout Procedure to ensure that it is functioning properly, and complies with the published specifications.

9.4 Technical Assistance

If technical assistance is required, contact Ohio Medical technical support listed on the back cover.

9.5 Return Instructions

1. Call 866-549-6446 for a return authorization.
2. Clean and sterilize the flowmeter.
3. Package the flowmeter securely for protection preferably in the original container.
4. Include a letter describing in detail any difficulties experienced with the flowmeter. Include the person, title, and telephone number to contact for functional questions.
5. Ohio Medical now offers a ten year warranty on flow meters sold on or after July 1, 2005. If the flowmeter was purchased on or after July 1, 2005 and is less than ten years old or if the flowmeter is covered under the previous warranty and is less than five years old, include the warranty information that came with the device and a copy of the invoice,.
6. Include a purchase order to cover repair of a flowmeter not under warranty.
7. Ship the flowmeter prepaid. Write your return address and billing address information on the package or letter that comes with the package.

   For all repairs, contact your nearest Ohio Medical Medical office or authorized Ohio Medical Distributor.

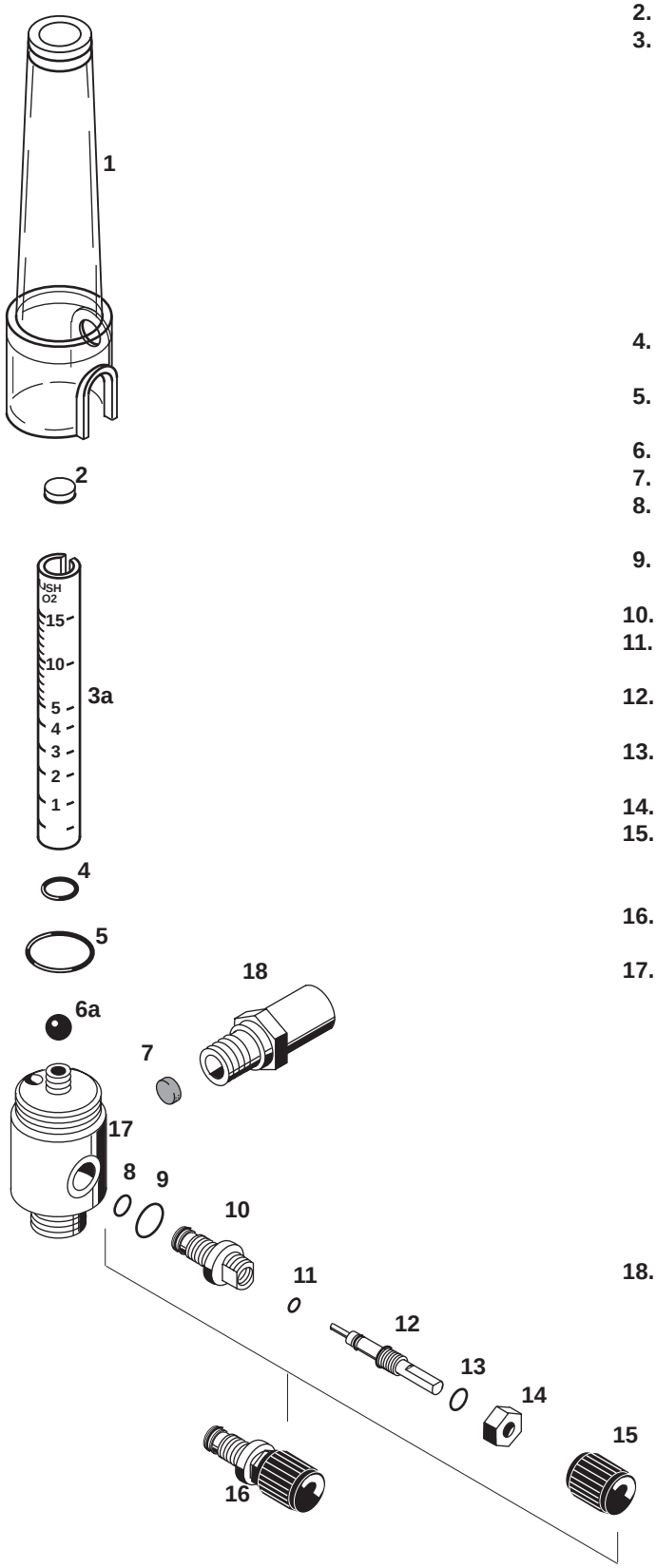
9.6 Lifetime Warranty Policy

Ohio Medical offers an exclusive warranty on the Shroud and Flowtube components. Should either break under normal usage, Ohio Medical will replace them at no charge.

For replacement shrouds and flow tubes, contact your nearest Ohio Medical office or authorized Ohio Medical Distributor.

10.1 Illustrated Parts

10.1.1 Illustrated Parts for 0 - 15 l/min Flowmeters



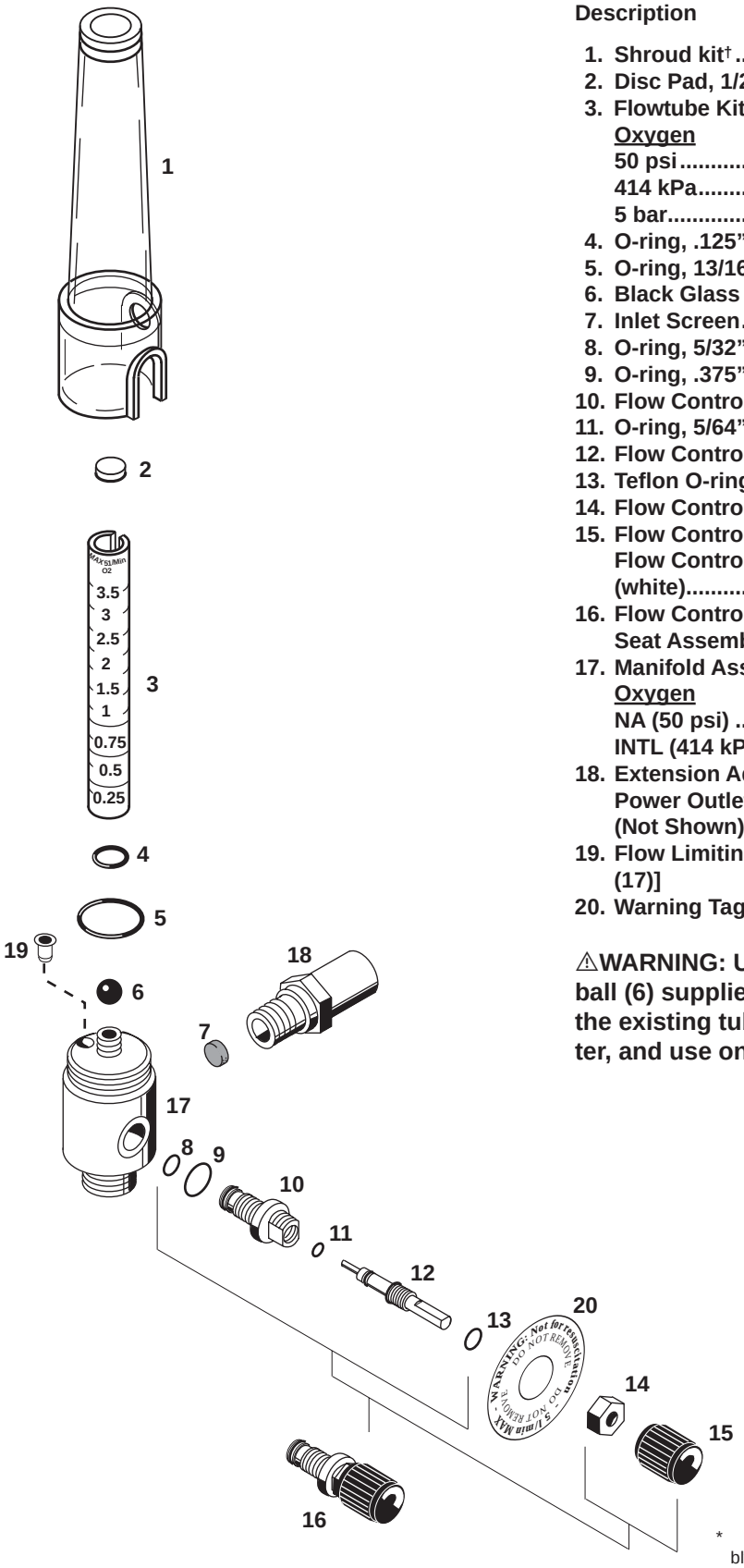
Description

1. **Shroud Kit*** 0205-0492-100**
2. **Disc Pad, 1/2” Dia., 1/4” Thick 0210-6508-300**
3. **Air Flowtube, 50 PSI, (0 - 15 l/min).. 0212-0174-100**
   Air Flowtube, 414 kPa (60 psi), (0 - 15 l/min)..... 6700-0006-400
   Air Flowtube, 5 bar (72.5 psi), (0 - 15 l/min) 6700-0202-500
   O_2 Flowtube, 50 psi, (0 - 15 l/min) 0212-0172-100
   O_2 Flowtube, 414 kPa (60 psi), (0 - 15 l/min) 6700-0005-400
   O_2 Flowtube, 5 bar (72.5 psi), (0 - 15 l/min) 6700-0201-500
4. **O-ring, .125” ID, .250” OD, .062” W 0210-0593-300**
5. **O-ring, 13/16” ID, 15/16” OD, 1/16” W 0210-0525-300**
6. **Black Glass Ball, 1/4” Dia. 0409-1714-300**
7. **Inlet Screen 6700-0009-300**
8. **O-ring, 5/32” ID, 9/32” OD, 1/16” W 0210-0526-300**
9. **O-ring, .375” ID, .500” OD, .062” W 6700-0130-500**
10. **Flow Control Valve Seat ..... ***
11. **O-ring, 5/64” ID, 13/64” OD, 1/16” W 0210-0527-300**
12. **Flow Control Valve (Needle Valve) ..... ***
13. **Teflon O-ring, 3/16” ID, 5/16” OD 0210-0536-300**
14. **Flow Control Valve Cap End 0205-0488-535**
15. **Flow Control Knob (Black) 0212-1958-300**
    Flow Control Knob, INTL and GR O2 (White) 6700-0200-500
16. **Flow Control Knob Valve and Seat Assembly 6700-0001-700**
17. **Manifold Assembly (0 - 15 l/min)****
    <u>Oxygen</u>
    NA (50 psi) 6700-0377-850
    INTL (414 kPa) 6700-0383-850
    CAN (50 psi) 6700-0382-850
    <u>Air</u>
    NA (50 psi), (Air DISS) 6700-0378-850
    NA (50 psi), (O_2 DISS) 6700-0379-850
    INTL (414 kPa), (O_2 DISS) 6700-0387-850
    CAN (50 psi), (Air DISS) 6700-0380-850
    CAN (50 psi), (O_2 DISS) 6700-0381-850
18. **Extension Adapter 0204-0492-535**
    Power Outlet Extension (Not Shown) 0205-0495-535

* Sold only as part of Flow Control Knob Valve and Seat Assembly (16).

** Manifold Assembly includes part (17) with label and parts (4), (5), and (7).

10.1.2 Illustrated Parts for Lo-Flo 3.5 Flowmeters



Description

1. **Shroud kit† 0205-0492-100**
2. **Disc Pad, 1/2” Dia., 1/4” Thick 0210-6508-300**
3. **Flowtube Kit (0 - 3.5 l/min)****
   Oxygen
   50 psi 6700-0404-850
   414 kPa 6700-0405-850
   5 bar 6700-0662-850
4. **O-ring, .125” ID, .250” OD, .062” W 0210-0593-300**
5. **O-ring, 13/16” ID, 15/16” OD, 1/16” W 0210-0525-300**
6. **Black Glass Ball, 1/4” Dia. .....****
7. **Inlet Screen 6700-0009-300**
8. **O-ring, 5/32” ID, 9/32” OD, 1/16” W 0210-0526-300**
9. **O-ring, .375” ID, .500” OD, .062” W 6700-0130-500**
10. **Flow Control Valve Seat ..... ***
11. **O-ring, 5/64” ID, 13/64” OD, 1/16” W0210-0527-300**
12. **Flow Control Valve (Needle Valve) ..... ***
13. **Teflon O-ring, 3/16” ID, 5/16” OD 0210-0536-300**
14. **Flow Control Valve Cap End 0205-0488-535**
15. **Flow Control Knob (Black) 0212-1958-300**
    Flow Control Knob, INTL and GR O2 (white) 6700-0200-500
16. **Flow Control Knob Valve and Seat Assembly 6700-0001-700**
17. **Manifold Assembly (0 - 3.5 l/min)*****
    Oxygen
    NA (50 psi) 6700-0399-850
    INTL (414 kPa) 6700-0400-850
18. **Extension Adapter 0204-0492-535**
    Power Outlet Extention (Not Shown) 0205-0495-535
19. **Flow Limiting Orifice [included in manifold assembly (17)]**
20. **Warning Tag 6700-0412-100**

⚠WARNING: Use the Lo-Flo 3.5 flowtube (3) and ball (6) supplied together as a set when replacing the existing tube or ball in the Lo-Flo 3.5 Flowmeter, and use only with a Lo-Flo 3.5 manifold (17).

* Sold only as part of Flow Control Knob Valve and Seat Assembly (16).

** Flowtube kit contains one flowtube (3) and ball (6).

*** Lo-Flo manifold assembly includes part (17) with label, and parts (4), (5), (7), and (19).

10.2 Service Kits

10.2.1 Flow Control Valve Assembly

Flow Control Valve Assembly 6700-0001-700

Includes the following parts:
Flow control Valve
Flow control valve seat
Buna-N o-rings (3)
Teflon® (PTFE) o-ring
Cap nut
Knob

10.2.2 Flow Control Valve Assemblies (4)

Flow Control Valve Assemblies 6700-0025-700

Includes the following parts:
Four (4) flow control valve Assemblies at reduced cost

10.2.3 Flow Control Knobs (4)

Flow Control Knobs (Black)..... 6700-0100-200

Flow Control Knobs, INTL and GR O2 (white)..... 6700-0663-850

Includes the following parts:
Four (4) knobs at reduced cost

10.2.4 O-Ring Replacement Set

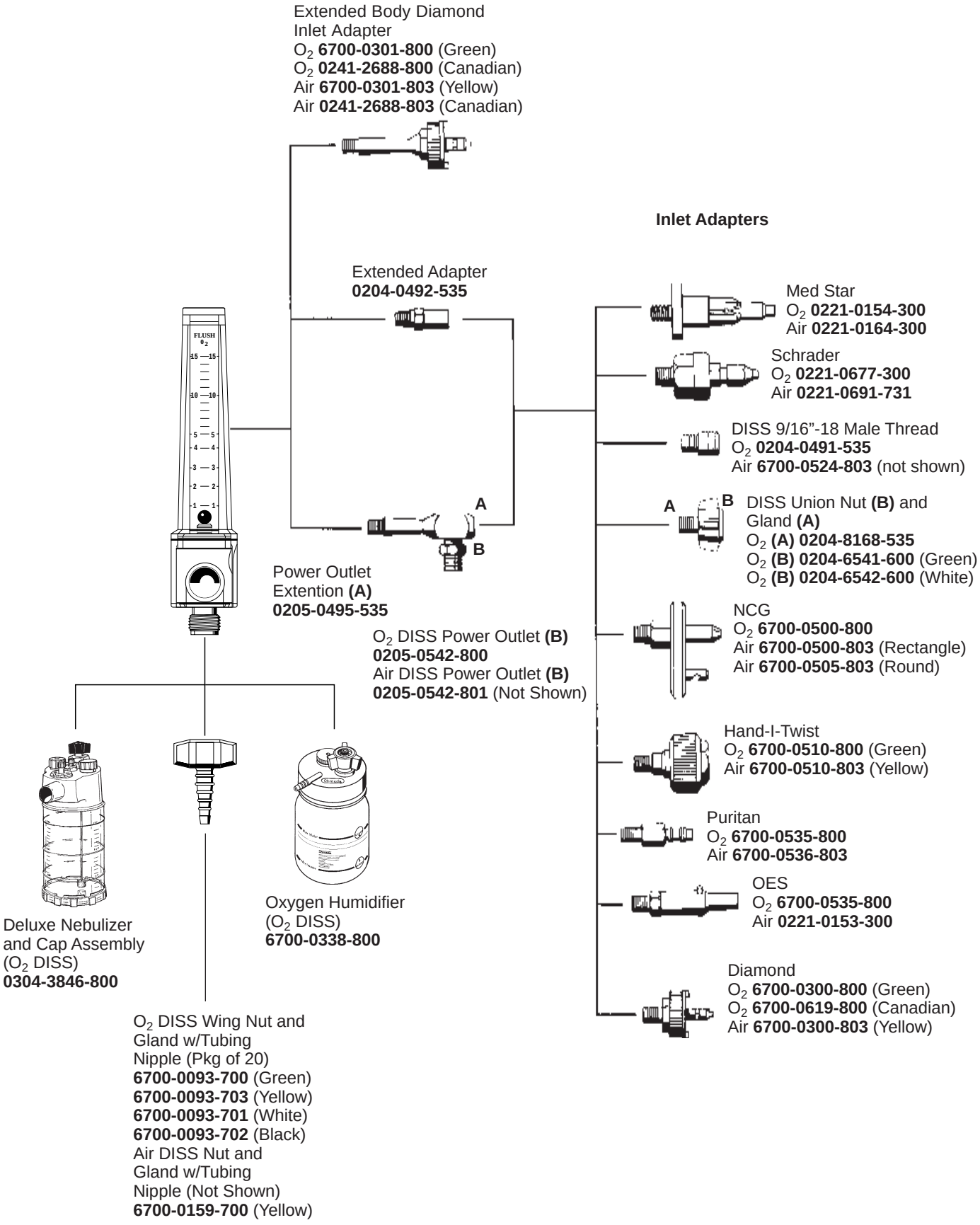
O-ring Replacement Set..... 6700-0359-850

Includes the following parts:
Five (5) Buna-N o-rings
One (1) Teflon o-ring

10.2.5 DISS Power Outlet with 1/8” NPT Male Thread, for use with the Ohmeda Medical “Y” Adapter.

O_2 6700-0068-700
Air 6700-0069-700

10.3 Fittings and Adapters



* Flowmeters purchased without a wall outlet adapter/probe are shipped with inlet fitting 0204-0492-535

10.4 North American (50 psi) Flowmeter Options

Instructions: Select the adapter, flowmeter and fitting to form an 11-digit part number.

Example: **6701-1260-921 =** **6701** Diamond Adapter | **1260** NA Oxygen Flowmeter (0 - 15 l/min) | **921** Tubing Nipple (Nut & Gland)

Adapters 67XX

No Adapter

6700 w/1/8" NPT Female

6701 Diamond

6702 Hand-I-Twist

6703 DISS Nut & Gland

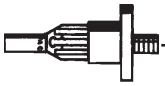
6704 Schrader

6705 NCG (Rect)

6706 NCG (Round)

6707 Puritan

6708 OES

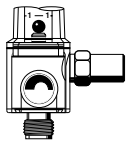


6709 Med Star

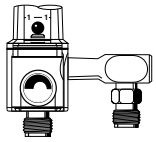
6714 DISS Male

Flowmeter Options 1XXX

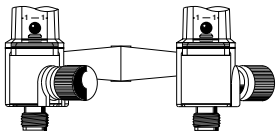
Oxygen Flowmeters



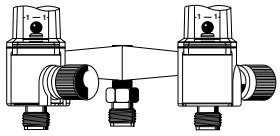
1260 (0 - 15 l/min)
1305 (0 - 3.5 l/min)
O_2 Flowmeter with O_2 DISS fitting



1261 (0 - 15 l/min)
1306 (0 - 3.5 l/min)
O_2 Flowmeter with O_2 DISS fitting and O_2 DISS power outlet

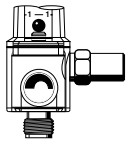


1262 (0 - 15 l/min)
1307 (0 - 3.5 l/min)
O_2 Twin flowmeter with O_2 DISS fitting

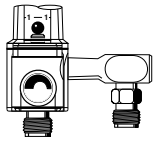


1263 (0 - 15 l/min)
1308 (0 - 3.5 l/min)
O_2 Twin flowmeter with O_2 DISS fitting and O_2 power outlet

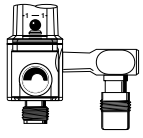
Air Flowmeters



1264 (0 - 15 l/min)
Air Flowmeter with O_2 DISS fitting

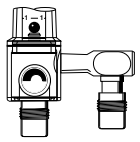


1265 (0 - 15 l/min)
Air Flowmeter with O_2 DISS fitting and O_2 DISS power outlet



1266 (0 - 15 l/min)
Air Flowmeter with O_2 DISS fitting and air power outlet

1267 (0 - 15 l/min)
Air Flowmeter with air DISS fitting

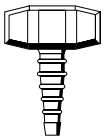


1268 (0 - 15 l/min)
Air Flowmeter with air DISS fitting and air

Fittings 9XX

No Fitting

907 w/DISS Male



921 Tubing Nipple Nut and Gland

10.5 International (414 kPa) Flowmeter Options

Instructions: Select the adapter, flowmeter and fitting to form an 11-digit part number.

Example:	**6715-1280-921 =**	**6715** BSP	**1280** International Oxygen Flowmeter (0 - 15 l/min)	**921** Tubing Nipple (Nut & Gland)

Adapters 67XX

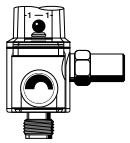
No Adapter

6700
w/1/8” NPT Female

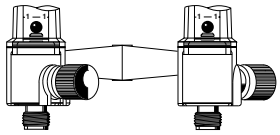
6715
BSP

Flowmeter Options 1XXX

Oxygen Flowmeters

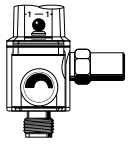


1280 (0 - 15 l/min)
1309 (0 - 3.5 l/min)
O_2 Flowmeter with O_2 DISS fitting

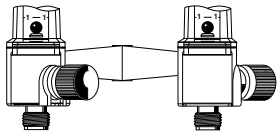


1292 (0 - 15 l/min)
1313 (0 - 3.5 l/min)
O_2 Twin flowmeter with O_2 DISS fitting

Air Flowmeters



1286 (0 - 15 l/min)
Air Flowmeter with O_2 DISS fitting

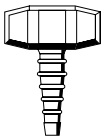


1298 (0 - 15 l/min)
Air Twin flowmeter with O_2 DISS fitting

Fittings 9XX

No Fitting

907
w/DISS Male



921
Tubing Nipple Nut and Gland

10.6 Canadian (50 psi) Flowmeter Options

Instructions: Select the adapter, flowmeter and fitting to form an 11-digit part number.

Example:	**6703-1284-921 =**	**6703**	**1284**	**921**
		DISS Union Nut & Gland	Canadian Oxygen Flowmeter (0 - 15 l/min)	Tubing Nipple (Nut & Gland)

Adapters 67XX

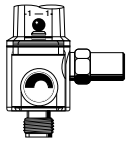
No Adapter

6700
w/1/8" NPT Female

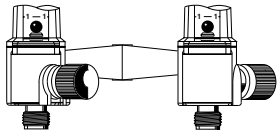
6703
DISS Union Nut & Gland

Flowmeter Options 1XXX

Oxygen Flowmeters

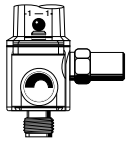


1284 (0 - 15 l/min)
O_2 Flowmeter with O_2 DISS fitting



1296 (0 - 15 l/min)
O_2 Twin flowmeter with O_2 DISS fitting

Air Flowmeters



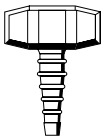
1290 (0 - 15 l/min)
Air Flowmeter with O_2 DISS fitting

1291 (0 - 15 l/min)
Air Flowmeter with Air DISS fitting

Fittings 9XX

No Fitting

907
w/DISS Male



921
Tubing Nipple Nut and Gland

10.7 German (5 bar) Flowmeter Options

Instructions: Select the adapter, flowmeter and fitting to form an 11-digit part number.

Example:	**6715-1400-921 =**	**6715** BSP	**1400** German Oxygen Flowmeter (0 - 15 l/min)	**921** Tubing Nipple (Nut & Gland)

Adapters 67XX

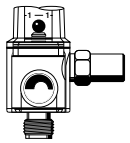
No Adapter

6700
w/1/8” NPT
Female

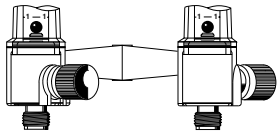
6715
BSP

Flowmeter Options 1XXX

Oxygen Flowmeters

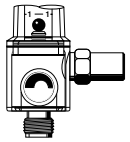


1400 (0 - 15 l/min)
1404 (0 - 3.5 l/min)
O_2 Flowmeter with
O_2 DISS fitting

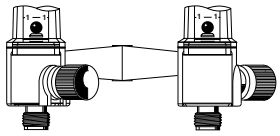


1401 (0 - 15 l/min)
1405 (0 - 3.5 l/min)
O_2 Twin flowmeter
with O_2 DISS fitting

Air Flowmeters



1402 (0 - 15 l/min)
Air Flowmeter with
O_2 DISS fitting

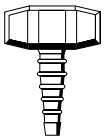


1403 (0 - 15 l/min)
Air Twin flowmeter
with O_2 DISS fitting

Fittings 9XX

No
Fitting

907
w/DISS Male



921
Tubing Nipple
Nut and Gland

Appendix

A.1 Installation procedure for Adapters/Probes and Fittings

⚠CAUTION: An Ohio Medical power outlet extensinon, twin "Y" adapter or extension adapter must be directly connected to the flowmeter manifold prior to connection to the supply gas.

All adapters/probes and fittings should be sealed and installed properly to prevent leaks and to support the equipment when mounted. The flowmeter inlet port is 1/8"-27 NPTF tapered pipe thread. It is important to note that adapters/probes and fittings seal on the thread and may have threads exposed after they have been tightened properly.

Prior to installing the adapter/probe or fitting, seal the thread with a small amount of Teflon® (PTFE) tape or Lox-8™ paste.

⚠CAUTION: Do not use any Loctite® (or any product which contains methacrylate ester) on any part of the flowmeter or connected fittings. Loctite® may damage plastic components.

The torque range for installing adapter/probes and fittings is 8.0 ft-lb (10.8 N-m) minimum to 11 ft-lb (14.9 N-m) maximum.

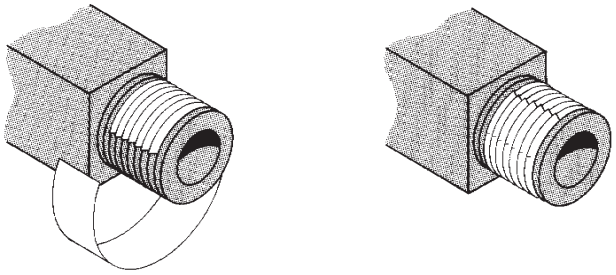
Adapters/probes and fittings which are not keyed for specific orientation, should be torqued to approximately 10.0 ft-lb (13.5 N-m).

Adapters/probes and fittings that are keyed to specific orientation, must be torqued initially to 8.0 ft-lb (10.8 N-m). Additional torque is applied only until orientation is correct.

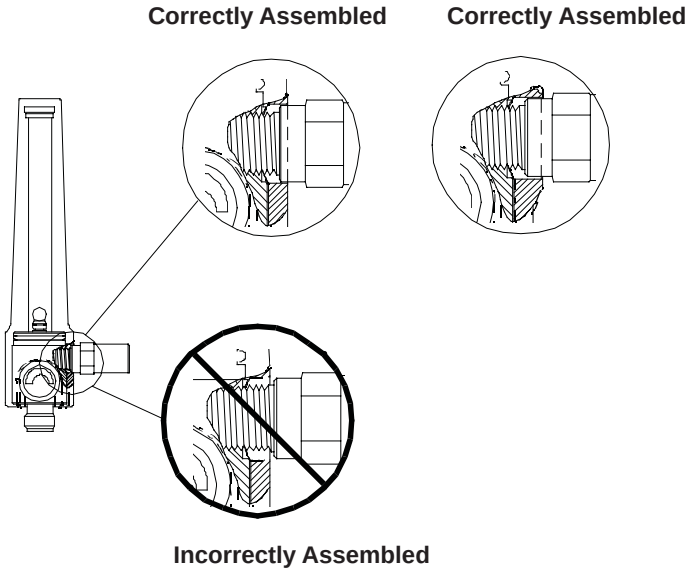
⚠WARNING: Make sure the inlet adapter is properly seated in the flowmeter shroud. If only the adapter threads are inside the shroud inlet hole, cracking and leakage may occur under pressure.

⚠WARNING: Never mix adapters of different gases or vacuum. Cross connection can result in serious patient injury or damage to equipment.

A.2 How to Use Teflon Tape



Apply Teflon® tape around all pipe threads. Wrap the tape clockwise, starting one thread up, as viewed from the end of the male fitting. Apply enough pressure so the tape just starts to follow the contours of the threads. Wrap two layers of tape.



Ohio Medical Corporation
1111 Lakeside Drive
Gurnee, Il 60031-04099
USA
Phone: 866-549-6446
Outside US: +1 847-855-0800
Fax: +1 847-855-6218
www.ohiomeidcal.com

Ohio Medical Corporation
Authorized Representative
(OxygenCare Ltd.)
Corrig Road
Sandyford Industrial Est.
Dublin 8
Ireland
Phone +35 31 295 3421

North America

United States

Customer Service and
Distribution Center
Ohio Medical Corporation
1111 Lakeside Drive
Gurnee, IL 60031 USA
P: 866 549 6446
P: +1 847 855 0800
F: +1 847 855 6218

Technical Support
Ohio Medical Corporation
1111 Lakeside Drive
Gurnee, IL 60031 USA
P: 866 549 6446
P: +1 847 855 0800
F: +1 847 855 6218

Sales and Service
Ohio Medical Corporation
1111 Lakeside Drive
Gurnee, IL 60031 USA
P: 866 549 6446
P: +1 847 855 0800
F: +1 847 855 6218

Equipment Service Center
Ohio Medical Corporation1
111 Lakeside Drive
Gurnee, IL 60031 USA
P: 866 549 6446
P: +1 847 855 0800
F: +1 847 855 6218

6700 0094 000
12 05 C 13 10 06
Printed in USA
www.ohiomedical.com